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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/555,046	08/11/2000	DONG-KYU KIM	Q58827	8002

7590 03/19/2004

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EXAMINER

HOANG, THAI D

ART UNIT PAPER NUMBER

2667

DATE MAILED: 03/19/2004

16

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/555,046

Applicant(s)

KIM ET AL.

Examiner

Thai D Hoang

Art Unit

2667

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on Application filed on 08/11/2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 7 is/are rejected.
- 7) ☒ Claim(s) 5 and 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

The disclosure is objected to because of the following informalities:

Page 6, lines 12-13, formula (3) does not include the term  $\gamma(\bullet)$  as disclosed in line 13.

Appropriate correction is required.

### ***Claim Objections***

Claim 7 is objected to because of the following informalities:

Claim 7 does not define variable N.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-4 and 7 are rejected under 35 U.S.C. 102(e) as being unpatentable over Marchok et al., US patent No. 6,122,246, hereafter referred to as Marchok.

Regarding claims 1 and 4, Marchok discloses an apparatus and method for clock synchronization in a multi-point OFDM/DMT digital communications system. Marchok teaches that the system comprises a receiver 150, which performs the steps of:

extracting pilot tone from OFDM received signal and detecting phase and frequency differences for adjusting; fig. 3; col. 2, lines 38-46; col. 4, lines 47-50; col. 5, lines 37-40; col. 15, lines 29-36 (extracting a pilot signal from fast-Fourier-transformed OFDM received signals, and detecting inter-pilot phase differences);

averaging phase differences; col. 9, lines 25-39; col. 8, lines 40-45; and normalizing the mean phase difference; col. 9, line 66-col. 10, line 8; col. 16, lines 24-29, lines 52-57; col. 18, line 66-col. 19, line 5; col. 19, lines 29-34; col. 20, lines 43-49 (averaging phase differences detected in step (a) for a symbol to generate a mean phase difference value and a normalizing the mean phase difference by dividing the mean phase difference value into reference values corresponding to phase differences

Art Unit: 2667

generated when FFT window errors of at least to one sample exist, thereby to generate a normalized value);

simultaneously controlling Fast Fourier Transform window and sampling clock offset (element 240) by using the normalized value generated by element 185; col. 5, line 40 –col. 6, line 13; col. 7, lines 23-42; col. 11, line 64–col. 12, line 35 (simultaneously controlling the FFT window position offset using a value obtained by rounding off the normalized value of the step (b), and the sampling clock offset using the difference between the round-off value and the normalized value.)

Regarding claim 2, the system disclosed by Marchok inherently applies integer values for controlling FTT window position offsets and uses fraction values for controlling sampling clock offsets; col. 11, lines 20-63.

Regarding claim 3, Marchok discloses the system comprising:

a Digital/Analog converter 108 for converting OFDM signal to digital samples; fig. 3; col. 4, lines 43-45 (an analog-to-digital converter (ADC) for converting an OFDM signal into digital complex samples);

a digital signal processing portion 185 processes the digital data signals received from the analog-to-digital converter 180 undergo a Fourier Transform, preferably an FFT, to extract the frequency and phase components of the received signal (col. 4, lines 47-50), then calculating phase differences (col. 2, lines 38-46; col. 4, lines 47-50; col. 5, lines 37-40; col. 15, lines 29-36), averaging these phase differences (col. 9, lines 25-39; col. 8, lines 40-45), and normalizing the mean value (col. 9, line 66–col. 10, line 8; col.

Art Unit: 2667

16, lines 24-29, lines 52-57; col. 18, line 66-col. 19, line 5; col. 19, lines 29-34; col. 20, lines 43-49) (an FFT window for removing the guard interval from the digital complex samples output by the ADC and outputting useful data samples; an FFT for fast-Fourier-transforming the samples output by the FFT window; a phase difference calculator for calculating phase differences between two to values among the complex values received via a plurality of pilots from the FFT, averaging the phase differences for one symbol to generate a mean phase difference value, and normalizing the mean phase difference value by dividing the mean phase difference value into predetermined reference values);

a VCXO portion 240 controls window position and sampling clock signal by using normalized value received from portion 185; col. 5, line 40 –col. 6, line 13; col. 7, lines 23-42; col. 11, line 64-col. 12, line 35 (an FFT window controller for rounding off the normalized value output by the phase difference calculator and controlling the window position of the FFT window; and a phase synchronous loop for controlling the sampling clock signals of the ADC using the difference between the round-off value and the normalized value).

Regarding claim 7, Marchok discloses that the normalized value is calculated by multiplying the phase differences to the mean value; col. 16, lines 34-30, 52-58; col. 19, lines 1-5, lines 29-34; col. 20, lines 43-49 (the OFDM receiver for interlocking FFT window position recovery with a sampling clock control as claimed in claim 4, wherein the normalization of the normalizer is carried out by multiplying N to the mean value).

***Allowable Subject Matter***

Claims 5-6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following references are cited to further show the state of the art with respect to the application:

US Patent No. 5,867,478 A, Baum et al. disclose "Synchronous coherent orthogonal frequency division multiplexing system, method, software and device"

The following publications are cited to further show the state of the art with respect to the application:

L. Litwin and M. Pugel, "The principles of OFDM", <http://rfdesign.com/>, Jan 1, 2001, pp. 30-48.


H. Zou, B. McNair, and B. Daneshard, "An Intergrated OFDM Receiver for High-Speed Mobile Data Communications",  
[http://www.novidesic.com/pubs/globecom01\\_final3.pdf](http://www.novidesic.com/pubs/globecom01_final3.pdf); October 2001.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thai D Hoang whose telephone number is (703) 305-3232. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (703) 305-4378. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thai Hoang

  
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